

# Final Exam Review

## Math 214 – Spring 2010

### General Info:

- You are responsible for every homework exercise and/or proof, in-class exercise and/or proof, and in-class example/definition
- Know full statements of definitions and theorems
- All Math 214 relevant work is expected to be shown directly on the exam

### Main Topics:

- Note/Disclaimer: This is only a list of the highlights, and I may (likely will) use words/theorems for proofs/etc that are not listed here. Be sure to review all definitions/theorems from previous quizzes/exams, especially the “important” ones.
- Theory mostly from Chapters 5-8, but you also need to be proficient with the earlier ones (as tools and examples for Chapters 5-8)
- Some things you may be asked to do: Find inverse, calculate anything involving row reducing, solve systems, calculate determinants
- Vector Spaces
  - Define, prove, disprove
  - Subspaces
    - Define, determine, prove, disprove
  - Compose bases for various finite dimensional vector spaces, including row spaces, column spaces, and null spaces of matrices.
  - Define/Prove/Disprove/Etc Linear Independence, Span, Basis
- Inner Product Spaces
  - Define, prove, disprove
  - Compute length, angles, and/or projections
  - Define/determine orthogonality of vectors
  - Gram-schmidt
  - Orthogonal Matrices: Define/Prove
- Eigenvalues, Eigenvectors
  - Define/compute eigenvalues/eigenvectors/eigenspaces
  - Diagonalize (orthogonally) a matrix or demonstrate that the matrix is not (orthogonally) diagonalizable.
  - Calculate  $n^{\text{th}}$  powers of matrices, including eigenvalues/eigenvectors for  $A^n$
- Linear Transformations
  - Define, prove/disprove
  - Find/Define  $\ker(T)$ ,  $R(T)$
  - Find matrices of transformations
  - Rank, nullity, dimension theorem
- The list of equivalent statements – know them all and their implications

### Preparing for the Test

- Work through the review exercises
- Know definitions and theorems (precise statements)
- Rework old exams and quizzes